

America's High Schools

The Front Line in the Battle for Our Economic Future

Too many Americans think of high school only as an adolescent rite of passage, a place where the joy and turmoil of the teenage years are romanticized on television and in film and where the struggle for academic proficiency is merely one aspect of a larger drama. But the time has come to think of high school in a more crucial and substantial context.

High school is where America's young people enter the adult world, not just socially, but more important, economically. Whether they realize it or not, it is where they begin preparing themselves for the economic environment in which they will compete and earn their livelihoods. Its importance is seen in the alarming reality that the United States has one of the lowest graduation rates of all developed nations, in the strikingly low percentage of students ready to use high school as a springboard for success in college and beyond, and in the pressing need for lifelong learning and effective citizenship in an increasingly demanding era of technology and global linkage.

This paper investigates the relationship between America's high schools and the challenges our economy faces. The message found here is a simple but clear one: *High school is now the front line in America's battle to remain competitive on the increasingly competitive international economic stage.* Over the past few years, Achieve, Inc., and the National Governors Association Center for Best Practices have undertaken a series of activities regarding the importance of high school and identified a path to high school education reform. This paper is a "call to action" for the nation's governors and business and education leaders to combine that understanding with an appropriate sense of urgency — and to turn the nation's high schools into a path toward economic success for all students.

Economic Change in the Years Ahead: A "Perfect Storm"

Economic change and growth are inseparable. Growth occurs as innovation and investment create new ways of doing things, which in turn make society more productive and better off. This steady stream of innovation and investment, multiplied over the years, has made America the most prosperous nation in the history of the planet. When one takes into account the convenience, mobility, health and range of amenities available to average Americans, they have a standard of living far greater than kings of previous centuries did.

But economic change also entails costs — the dislocations and displacements that occur as the old activities are replaced by the new, from mule drivers and wheelwrights to the makers of tube radios and adding machines. Over the generations of American economic history, the growth created by change has traditionally been strong enough to create new pursuits and new economic roles for those displaced by innovation. There is no reason to

doubt our economy will continue to have that capacity. However, there also are important reasons to believe our economy is about to face stresses like never before, and we must prepare for these challenges.

In fact, our economy is entering a “perfect storm” of economic change, in which three powerful forces are converging upon us at once:

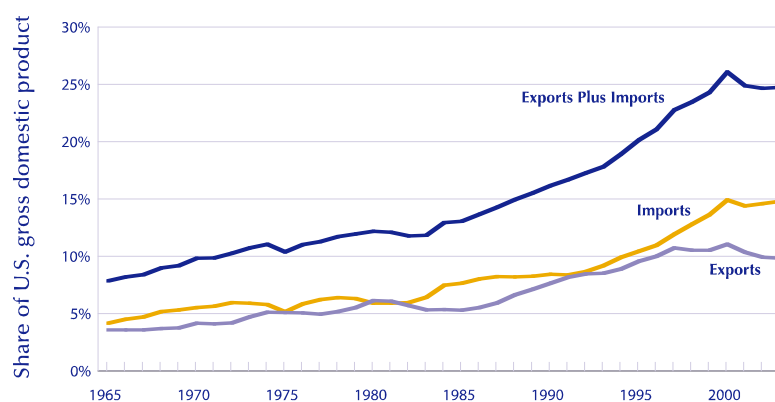
- *Technology* is accelerating, and its effects are becoming more pervasive. It affects not just what we produce but also what is asked of us and how we are organized to produce it.
- *Globalization* is accelerating as well, with the links among nations becoming not just more numerous, but deeper, as the developing world moves to higher-valued services once thought the exclusive province of the advanced nations.
- *Demographics* in the United States are about to change dramatically, as baby boomers enter retirement and the prime-age adult populations shrink in comparison to the numbers of old and young.

The demographic challenge facing America, and the entire developed world, is well known. It has created expectations for health care and retirement policy that, if unchanged, the nation can no longer afford to keep. But the full extent of technological change and globalization — and the way they interact — is yet to be fully understood.

The New Realities of the International Economy

Despite its obvious benefits, trade has fueled economic controversy for centuries. But regardless of one’s view of trade, the new realities of the international marketplace are undeniable.

Trade Accounts for an Increasing Share of Gross Domestic Product

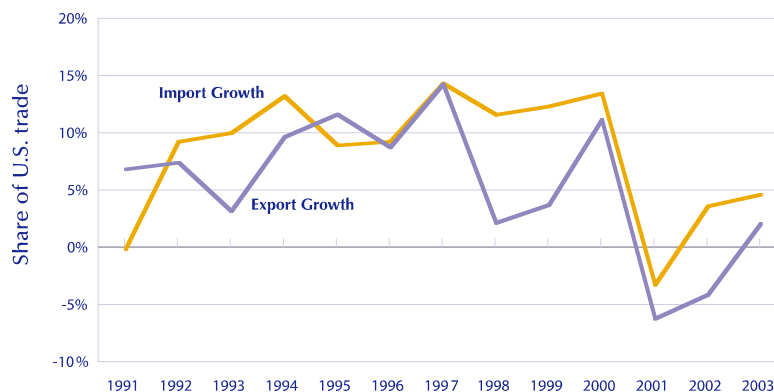


Source: Bureau of Economic Analysis, 2004.

First, trade is becoming pervasive. Successive rounds of trade negotiations have opened the global economy. The share of U.S. gross domestic product taken up by trade has risen from about 9 percent 40 years ago to about 18 percent 20 years ago to more than 25 percent today.¹ Over those last 20 years, U.S. foreign investment has grown six times faster than trade itself. Second, trade is no longer a matter of shipments of goods from an exporter to an importer. A growing share of U.S. trade occurs through “flag-affiliated” companies — that is, U.S. subsidiaries abroad — and a growing share of trade consists of services. The two are often related — as they would be, for example, in the case of a U.S. corporation that set up an off-shore data center, technical help-line or corporate backroom operation in a low-wage nation. In short, we are increasingly competing with ourselves in international trade.

Trade in services was once seen as America’s ace in the hole. And, in fact, America has a variety of very strong service industries, from education to software to entertainment, that sell to customers around the world. But America’s trade surplus in services is steadily shrinking — service imports have grown faster than service exports for seven straight years.²

Services Account for Increasing Share of Trade, But Imports Are Growing Faster Than Exports



Source: Bureau of Economic Analysis, 2004.

A third reality is that an increasing number of industries and activities are now subject to international competition. As digital technology drives down the cost of information and communications, it is possible to transact business from across the globe. A company can find suppliers, partners and customers anywhere in the world thanks to pervasive information networks. Any activity within a firm — not just component manufacturing, but such business services as product design, payroll management, accounting and invoicing, systems integration and management, and even research and development itself — can be held to the standard of the world’s best competitors. And if it fails that standard, it can be “outsourced” to a company that meets it, often by bringing lower costs to the fore.

The result is firms are now making themselves more competitive by breaking down into their constituent activities and making sure that each activity is being done in the “right” place. As a result, more of these services are becoming tradable, and more of the American economy — including more of its higher-value services — is exposed to global competition. Headlines about call centers moving to India are just one example of this phenomenon, as are Web designers in Ireland, software developers in Eastern Europe and customer service centers in the Philippines. Today, almost *anything* can be done *anywhere*.

This integration of the world economy through low-cost information and communications has an even more important implication than the dramatic expansion of both the volume of trade and what can be traded. *Trade and technology are making all the nations of the world more alike*. Together they can bring all of the world’s companies the same resources — the same scientific research, the same capital, the same parts and components, the same business services, and even the same skills. For example, India’s 200 research universities now turn out more than 5,000 Ph.D.s a year. Although this compares to 40,000 new Ph.D.s in the United States, it is a stark indication of the potential of the developing economies to compete in new and more advanced areas. Talented young people can attend universities in Bombay, Dublin or Seoul and become what demographers call “global denizens” who travel the world looking for seasonal high-tech work. These competitors, therefore, are becoming more like us — they have rising skill levels, a strong work ethic, their own world-class university systems, and access to the world’s capital and product markets. But there remains one critical difference between those nations and our own: *Their costs are lower*.

How Will America Respond?

Despite sporadic successes, the American response to date has been one of complacency leading to mediocrity. The towering heights of American achievement remain unmatched around the world — our Nobel-winning scientists, the cutting edge of American technology, the balanced working of the American economy and its entrepreneurial culture. But below these heights, the base is withering. Consider these facts alone:

- A recent study by the Organisation for Economic Co-operation and Development (OECD) showed that America’s literacy rate is average among the nations of the industrialized world and that our high school graduation rate — 73 percent — is one of the lowest among the industrialized nations;³
- Once the leader in education, the United States now ranks 14th in the number of years a 5-year-old may expect to attend school during the course of his or her life;⁴
- The U.S. university dropout rate — 34 percent — is among the highest in the industrialized world;⁵
- Of the 21 countries participating in the Third International Mathematics and Science Study, American high school seniors outperformed only students from Cyprus and South Africa and ranked behind such nations as Sweden, Canada, New Zealand, Russia and the Czech Republic;⁶

- Non-U.S. residents with temporary visas accounted for a third of the Ph.D.s awarded in science and engineering in 2003, despite any post-9/11 difficulties they might have experienced.⁷

Again, the U.S. economy has compelling assets. But it faces a fundamental challenge: whether it will keep up with the swift pace of human capital development being set elsewhere around the world. Mastering that challenge must start with reforming American high schools.

United States Trails Most Countries in High School Graduation Rate

Rank	OECD Reporting Country	Graduation Rate (%)
1	Denmark	100
2	Norway	97
3	Germany	93
4	Japan	92
5	Poland	90
5	Switzerland	90
7	Finland	85
7	Greece	85
9	France	82
9	Hungary	82
9	Italy	82
12	Czech Republic	81
13	Belgium	79
13	Iceland	79
15	Ireland	77
16	United States	73
17	Sweden	72
18	Luxembourg	68
18	Spain	68
20	Slovak Republic	61

Source: Organisation for Economic Co-operation and Development,
Education at a Glance 2004, 2004.

New Skills for a New Age

Our high schools are not working for too many of our students. Consider, for example, the results of the OECD's international comparisons of math and science conducted in 2003.⁸ Among those ranked, U.S. high school students tied for 27th place in math with Latvia and were slightly ahead of Portugal. Their science skills were roughly comparable to those of students in Iceland and Austria. These deficient skills translate directly into a reduced ability to solve basic problems, such as map-reading, scheduling, and converting weights and measures.

American teenagers rank at the bottom of the industrialized world in math problem solving and only in the middle of a list of nations at dramatically lower levels of development. How important is this skills difference? Economist Eric Hanushek of Stanford University estimates that if the gap were closed, American economic growth would increase by half a percentage point every year, or about a 20 percent increase in the economy's long-term potential.⁹

American Teenagers Lag Behind Their Developed World Counterparts in Problem Solving ...

Country	Mean Score
Japan	547
Australia	530
Canada	529
Belgium	525
Switzerland	521
Netherlands	520
France	519
Germany	513
Sweden	509
Ireland	498
United States	477
Italy	469

Note: This table includes a representative sample of developed nations that participated in the PISA study.

Source: Organisation for Economic Co-operation and Development, *Learning for Tomorrow's World: First Results from PISA 2003*, 2004.

... And They Are Often Not Competitive with Teenagers
from Less Developed Nations

Country	Mean Score
Korea	550
Hong Kong-China	548
Czech Republic	516
Poland	487
Latvia	483
Russian Federation	479
United States	477
Thailand	425
Serbia	420
Brazil	371

Note: This table includes a representative sample of less developed nations that participated in the PISA study.

Source: Organisation for Economic Co-operation and Development, *Learning for Tomorrow's World: First Results from PISA 2003, 2004*.

High school is important not just because it allows those who complete it to be more productive and to earn more, but because it is the first rung of an earnings ladder that provides affluence and mobility to those who climb it. Economists understand that education leads to productivity, which leads to income. Census data show the median earnings of a high school graduate (\$30,800) are 43 percent higher than those of a non-graduate (\$21,600) and those of a college graduate are 62 percent higher than those of a high school graduate.¹⁰

But technology is amplifying these differences; it is demanding new and advanced skills that our high schools are failing to teach. A generation ago, insurance claims adjusting, truck dispatching, steel foundry process management and machine lathing were all dramatically different in every respect. Today, they are all fundamentally similar — each requires manipulating data on a computer screen and using them to solve problems. Technology has changed the skills people need to work; as Harvard Business School's Shoshana Zuboff said in her epochal *In the Age of the Smart Machine*, technology has "migrated work from the muscles to the senses."¹¹ Economists David Autor, Frank Levy and Richard Murmane found that these changes in the skills required *in existing jobs and occupations* — that is, not even considering new jobs and occupations — accounted for a third or more of the greater demand for college graduates, mostly since 1980.¹²

These changes are pervasive. Economists Anthony Carnevale and Donna Desrochers found almost all categories of employment now require more advanced education today than they did 30 years ago.¹³ They show the share of office workers with "some college" has increased from 37 percent to 60 percent over that span; the share with a bachelor's degree has almost doubled, from 20 percent to 38 percent. Even factory work demonstrates the

trend — the share of factory workers with some higher education has increased *fourfold*, from 8 percent to 31 percent in the past three decades. And along with these higher levels of skill have come higher incomes. In a seminal report, economist Alan Krueger estimated that simply working with a computer implies a 15 percent increase in earnings, even after education and other factors are taken into account. In short, when jobs pay well, it is often because they demand the skills of a trade-intensive, high-tech world.¹⁴

In addition, trade is accelerating this trend toward higher skills. As foreign suppliers step into more advanced service industries, American workers must respond by becoming more productive. Insurance adjusters, truck dispatchers, lathers, machinists and foundry workers were the middle class of a generation ago. But the middle class of the next generation will be the people who work at terminals controlling those processes and the people who create the technology — the ideas, machines, software and services — that allow those jobs to change. Thus, America is faced with a stark choice — we can either climb the productivity ladder and re-create the American middle class, or we can watch our nation's middle class fade away as other countries' teenagers continue to outperform our children.

Why High School?

Taken together, these various findings display a disturbing pattern — *our high schools are failing to provide enough of our children with the skills that are becoming most important*. This is the one of the reasons why repairing our nation's high schools is so vital. America's distressingly low secondary graduation rate would be cause enough to justify a massive intervention in high school education. But high school is the bridge to higher education, and the bridge is increasingly in danger of collapse.

It is high school, specifically, where the failure occurs. For example, international student comparisons show American students report levels of both accomplishment and interest in math and science on par with their counterparts in other nations at both the 4th and 8th grade levels. But by grade 12, they fall far behind in their proficiency and report dramatically lower levels of interest. It is between 8th and 12th grade where the failure occurs.

And the failure resonates throughout the rest of a student's education. Success in high school readily translates into access to, and success at, higher levels of education. Research from the U.S. Department of Education indicates that the rigor of high school coursework is more important than parent education level, family income or race/ethnicity in predicting whether a student will earn a postsecondary credential.¹⁵ In short, being prepared for college is the best ticket for getting there. However, Jay Greene of the Manhattan Institute estimates that the high school graduation rate — by his estimate, 71 percent — is already low by international standards. Moreover, the share of high school students who take a course load preparing them for college is as low as 34 percent,¹⁶ and the share of high school students who are actually "college ready" is only 32 percent.¹⁷ In fact, his work shows that the college-ready rate is below 50 percent *in every state in the*

nation. Moreover, this share of college-ready students is disproportionately low for non-whites, who are growing as a share of the overall youth population.

This breakdown in building a bridge to college education is even more disturbing when the efforts of the 50 states to provide higher education and advanced graduate training are considered. Together, the 50 states spend \$63 billion annually to subsidize higher education. Obviously, this is an important part of a strategy to build local economies and attract a skilled workforce. Yet these investments will not yield the expected dividends unless high schools do a far better job of preparing students for postsecondary education. We register great concern over the declining number of U.S.-born or permanent resident Ph.D.s in the math, science and engineering areas. By tolerating low levels of achievement in high school, we are dramatically curtailing the pool of potential new Ph.D.s.

Beyond allowing American students access to higher levels of productivity and earnings, functioning high schools generate compelling societal benefits. As the endogenous growth theorists, led by economist Paul Romer, have noted, an ample supply of skilled workers accelerates the innovation process throughout the economy. Greater numbers of skilled and educated workers make it easier to produce the “incremental improvements” that account for the vast majority of long-term economic growth: They lower the cost of doing research; they make it easier to disseminate new knowledge and adopt it to new uses; and they allow for greater specialization in research and science, among other benefits. In short, high schools are the spring from which these vital sources of growth flow.

And high school builds a better citizenry. Aside from the obvious benefits of educational achievement — lower demands for social services, lower rates of incarceration, better parenting and public health, and better preparation of the subsequent generation of small children for school, among many others — higher levels of education prepare our citizenry for the ever more sophisticated issues they must confront.

The Road Not Taken

High school, beyond the front line of international economic competition, is the dividing line between those workers whose incomes have been rising and those whose incomes have been falling. The average wages of high school graduates and those individuals who never graduated high school have fallen over the last two decades; the average incomes of those who went beyond high school have risen. This demarcation promises to become even starker in the coming years, as technology and trade separate the economy into two camps — those with the skills to participate in the global economy and those who lack them. If we do not make a concerted effort to move our society beyond this boundary, we will find ourselves a society cut in two — one side enfranchised in the modern economy, experiencing its affluence, the other lacking the means of access to the future. In short, we run the risk of losing our middle class.

A nation that cannot compete will never achieve prosperity. Absent the productivity that generates income, no combination of monetary or tax policies can undo the economy's hollowness. A lower standard of living will be forced on us. We will be engulfed in new service imports and will sell our assets to the rest of the world to pay for them. As growth slows, we will be unable to pay for an ever-shrinking pool of public services and will watch as our federal debt spirals out of control. At the very least, we will experience slow growth and stagnant wages with an upper tier of the labor force that gradually detaches from the rest of America's economy.

There is an alternative, but it is an alternative that requires our focus and effort. Economic change need not damage us if we prepare for it. There have always been exciting innovations in the economy. There have always been cheaper foreign competitors. And there have always been complex challenges to our economic growth. If we anticipate them and act, they can be turned into the basis for a higher standard of living for future generations of Americans.

High school lies at the center of this crisis. Fifty years ago, it was finishing school for the American middle class. Today, it must be more. It must be a bridge to higher education, to a productive and innovative economy, and to an informed citizenry. It is time to transform our country's high schools to reflect these new realities.

Notes

1. Bureau of Economic Analysis (BEA), data tables, "Real Exports and Imports of Goods and Services by Type of Product," Quantity Indexes (Washington, D.C.). Available: <http://www.bea.doc.gov>.
2. BEA, data tables, "Real Exports and Imports of Goods and Services by Type of Product," Quantity Indexes (Washington, D.C.). Available: <http://www.bea.doc.gov>.
3. Organisation for Economic Co-operation and Development (OECD), *Learning for Tomorrow's World: First Results from PISA 2003* (Paris, France, December 2004). Available: <http://www.oecd.org>.
4. OECD, *Education at a Glance, 2004*, Table C1.1 (Paris, France, September 2004). Available: <http://www.oecd.org/dataoecd/62/16/33671115.xls>.
5. OECD, *Education at a Glance, 2004*, Table A3.2 (Paris, France, September 2004). Available: <http://www.oecd.org/dataoecd/52/38/33669031.xls>.
6. International Association for the Evaluation of Educational Achievement (IEA), Third International Mathematics and Science Study (TIMSS), 1995–96.
7. National Science Foundation, Division of Science Research Statistics, *Science and Engineering Doctorate Awards, 2003*, Table 3 (Arlington, Va.: National Science Foundation, December 2004).
8. OECD, *Learning for Tomorrow's World: First Results from PISA 2003* (Paris, France, December 2004). Available: <http://www.oecd.org>.
9. Eric Hanushek and Dongwook Kim, "Education, Laborforce Quality, and Economic Growth," Working Paper 5399 (Cambridge, Mass.: National Bureau of Economic Research, December 1995).
10. Cited in *Education Pays 2004* (New York: College Board) p.10.
11. Shoshana Zuboff, *In the Age of the Smart Machine: The Future of Work and Power* (New York: Basic Books, 1989).
12. David Autor, Frank Levy and Richard Murmane, "The Skill Content of Recent Technological Change: An Empirical Exploration," Working Paper 8337 (Cambridge, Mass.: National Bureau of Economic Research, June 2001).
13. Anthony Carnevale and Donna Desrochers, *Standards for What? The Economic Roots of K–16 Reform* (Princeton, N.J.: Educational Testing Service, 2003).
14. Alan B. Krueger, "How Computers Have Changed the Wage Structure: Evidence from Microdata, 1984–1989," *Quarterly Journal of Economics* February 1993: 33–60.
15. Clifford Adelman, *Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment* (Washington, D.C.: U.S. Department of Education Office of Educational Research and Improvement, 1999).
16. Jay P. Greene, *Public High School Graduation and College Readiness Rates: 1991–2002* (New York: Manhattan Institute, forthcoming). Available: http://www.manhattan-institute.org/html/ewp_08.htm.
17. Jay P. Greene and Greg Forster, "Public High School Graduation and College Readiness Rates in the United States," Working Paper 3 (New York: Manhattan Institute Education, September 2003).